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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	**Confirmation No. 9813**
Gerhard COUFAL	:	Docket No. 2001_0462A
Serial No. 09/830,074	:	Group Art Unit 1624
Filed April 23, 2001	:	Examiner V. Balasubramanian

METHOD FOR PRODUCING PURE MELAMINE

THE COMMISSIONER IS AUTHORIZED TO CHARGE ANY DEFICIENCY IN THE FEES FOR THIS PAPER TO DEPOSIT ACCOUNT NO. 23-0975

SUPPLEMENTAL RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following remarks are supplemental to those in the Response to Final rejection filed on December 4, 2002, which are now entered as a result of an RCE filed on March 10, 2003.

In the following, the novelty and non-obviousness of the claimed invention will be discussed.

I. The Present Invention

The main idea of the present invention is that melamine melt is cooled down to a temperature close to the solidification (=melting) temperature, but still above the melting temperature. In claim 15 this is indicated by the temperature range of 1 to 50°C above the melting point. This melt is subsequently quenched.

None of the prior art documents disclose or suggest those two steps.

The Final Rejection maintains that the invention does not exclude "small variations" below the melting point.

This statement is not correct since those small variations are of little practical concern to the art-skilled as will now be explained.

The claimed invention seeks to protect a process with a melamine melt above the melting point; the temperature range indicated just specifies this. This excludes specifically solid melamine

obtained by "just" cooling below the melting point. If in a real process solidification of melamine does happen, this would result in a major problem due to blocking of equipment with some kind of sludge and any plant operator can easily note and remedy this.

The rejection further states that in claim 15 the wording "about 1°C above melting point" includes the solidification temperature.

From a logical point of view this is not correct. Claim 15 clearly states that melamine melt is kept above the melting point. Necessarily, "melt" implies that the temperature is above the melting point, even if infinitesimally.

If one would talk about water just above the freezing point, it is clear that one still talks about liquid water not solid ice. The claim 15 is thus clear and unequivocal in this respect.

2. Interpretation of Kokubo et al.

From the above it should be clear, that the claimed invention is only concerned with melamine melt cooled to a temperature just above the solidification temperature, but it is still a liquid. It is the molten melamine which is then quenched according to the present invention.

The rejection states that Kokubo et al. mentions the cooling of molten melamine (column 2, lines 59-64).

This cited passage clearly contains an error et al. evident to a person skilled in the art as will be explained below.

Kokubo et al. discloses a two step cooling, as described in column 2, lines 3-9.

Step 1: Molten melamine is cooled by ammonia to 200 to 270°C thereby solidifying the melamine; i.e. melamine is below the melting temperature.

Step 2: Solid melamine is then cooled to 100 to 200°C by the means of an aqueous solution of ammonia.

Kokubo's disclosure clearly indicates that he wants to solidify the melamine in one step. Once solidified, the solid melamine is cooled further.

Having said this, it is clear to a person skilled in the art that the cited passage of Kokubo cannot refer to cooling of molten melamine.

First, that passage is headed under the description of the second step (column 2, line 57). Furthermore, the cooling in the second step is explicitly mentioned after the solidification in the first step; i.e. the passage refers the cooling of solid melamine.

Second, the wording "cooling molten melamine to 100 to 200C°" indicates the temperature range of the second step, i.e. solid melamine is cooled. <u>It is physically impossible to cool molten melamine melt in that temperature range since it is always solid</u>.

Third, in column 2, line 59 hydrolysis is mentioned, which is a clear indication that an aqueous solution is implied for cooling in the second step. Please see also column 1, lines 35-37 and column 2, lines 65-71.

Fourth, in column 4, lines 52-60 the apparatus for the two cooling steps together with those temperature ranges is described, showing the separate solidifying and cooling steps. This is further described in Example 2 in column 6, lines 12-18.

In summary, Kokubo et al. cools melamine melt to solidify in one step, not to keep it above the solidification temperature as in the presently claimed invention.

The presently claimed invention requires melamine melt to present because the melt is then quenched; the solidification takes two steps instead of one in Kokubo et al.

Therefore, the passage cited in the rejection is in contradiction to the remaining disclosure of the prior art document. A person skilled in the art would not utilize such an obvious mistake to arrive at the presently claimed invention.

As should be clear from the above, the sequence of steps in the claimed invention is unobviously different from Kokubo et al.

3. <u>Canzi et al. and Hardeveld</u>

Canzi et al. and the presently claimed invention share one common step, i.e. the cooling of melamine melt to just above the solidification temperature.

But then the two teachings diverge.

Canzi et al. then slowly cools the melamine melt under pressure until solidification of the melamine is reached and after complete depressurization, the final melamine powder is obtained. Towards the end of the process depressurization is performed and melamine powder is obtained.

The presently claimed invention works in exactly the opposite direct way, i.e. rapid cooling of the melamine melt performed by quenching with water or an aqueous solution to reach melamine solidification.

So certainly, by using the teaching of Canzi et al. alone, a person skilled in the art would not arrive at the claimed invention without an inventive step.

The rejection states that the claimed invention would be obvious in view of Hardeveld.

In reply, Hardeveld is concerned with a very different process since this teaching already assumes that solid melamine produced by any other process is already present.

A person skilled in the art looking for a process to produce solid melamine from melamine melt would have no motivation to look at the teachings of Hardeveld.

Consequently Hardeveld is silent on how to solidify the melamine melt and, in fact, Hardeveld assumes low and high pressure processes; i.e. in the case of low pressure processes, melamine melt would not even occur since the melamine is in the gaseous phase.

Another reason why there is no motivation to combine the teachings of Canzi et al. and Hardeveld lies in the nature of the Canzi et al. process which is a "dry" process, i.e. no water is used. It is non-obvious to introduce a "wet" process step into the Canzi et al. teaching. Therefore, a person skilled in the art would hardly look at "wet processes" like the one by Hardeveld.

But even if a person skilled in the art would look at Hardeveld, no clue towards the claimed invention would be gleaned; the use of aqueous solution is very different.

Hardeveld dissolves solid melamine in water, whereas the claimed invention uses aqueous solution to quench melamine melt. While Hardeveld produces a solution, the claimed invention goes exactly in the opposite direction, i.e. using water to produce a solid.

So even if Hardeveld would be considered, it would require an inventive step to rearrange the use of water to arrive at the presently claimed invention.

The presently claimed invention is distinguished from the prior art by a non-obvious combination of a "dry step" (cooling of melt) and a "wet step" (quenching).

Actually, the prior art teaches that it would be counterproductive to bring melamine melt into contact with water. Kokubo et al. mentions this in column 1, lines 35-37 and lines 43-50. The contact with water would increase the unwanted byproducts and the detrimental hydrolysis of melamine.

True to that fact neither Canzi et al. nor Hardeveld try to do that, this is another indication that it is non-obvious to combine a "dry step" with a "wet step".

4. Experimental data

The Final Rejection states that the experimental data is not relevant because it was obtained at 370°C not at 320°C.

Certainly the choice of temperature in the experimental data of record is not arbitrary.

At 280 bar pressure (NH_3) the melting point of melamine is around 310°C. A typical high-pressure synthesis is performed at 370°C, i.e. the temperature of the melamine melt.

According to the present invention, this melt is cooled within 1 to 50°C above the melting point. This is why 320°C is chosen. At this temperature the melamine melt was quenched.

In the comparative example, the melamine melt was quenched at 370°C to show that the cooling towards the melting point has a beneficial effect.

Thus, the experimental data of record is representative of the present process and appropriate to establish the non-obviousness thereof.

For the foregoing reasons taken with those set forth in the Response to Final Rejection dated December 4, 2002, allowance of this application is respectfully requested.

If the Examiner considers that the foregoing does not resolve all the issues present, he is respectfully requested to contact undersigned at the telephone number below before issuing a further Office Action.

Respectfully submitted,

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